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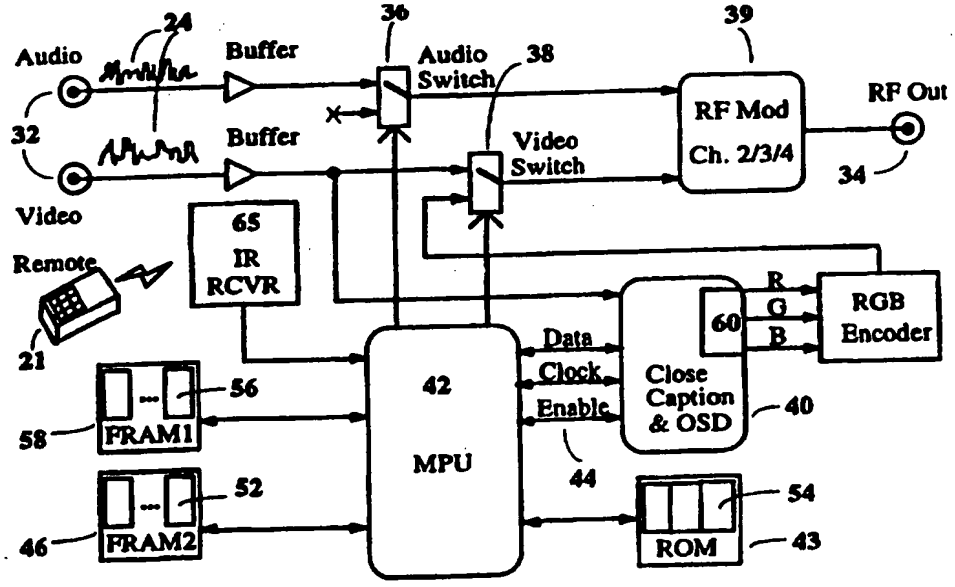
(54) Title: METHOD AND APPARATUS FOR SELECTIVELY BLOCKING AUDIO AND VIDEO SIGNALS



(57) Abstract

A method and apparatus block the reception of television programming which meets specified criteria. Data packets describing television programming are broadcast with the television signal. The data packets include at least packets which contain category information specifying a level in one or more multi-level categories and/or label information specifying labels applied to the program content of the signal. Data packets in an incoming video signal are detected by a blocking apparatus and compared to preferences stored in non-volatile memory in the blocking apparatus. If the contents of the data packets match or exceed the stored preferences then the video signal is blocked. The apparatus is field configurable. Configuration information specifying the rating scheme is transmitted to the apparatus. The methods of the invention are extremely flexible and allow several different rating systems to be used simultaneously.

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METHOD AND APPARATUS FOR SELECTIVELY BLOCKING AUDIO AND VIDEO SIGNALS

Field of the Invention

This invention relates to apparatus and methods for selectively blocking the reception of video signals in response to information which is encoded in the signals. The method and apparatus of the invention have particular application in controlling the content of television programming that can be displayed on a television.

Background of the Invention

Some television programs contain content which some viewers may consider to be offensive or inappropriate for viewing by their children. There is a need for an effective way to block offensive or inappropriate material from being viewed. As the number of available television channels increases it is becoming increasingly difficult for television viewers to locate and select programming that interests them from the many programs that may be completely uninteresting. There is a need for a system which would allow a television viewer to limit the selection of programs available for viewing to those programs which match the viewer's preferences.

Vogel, U.S. Patent No. 4,930,160 discloses methods and apparatus for censoring video programs. If a classification code encoded in the video or audio portion of a video signal matches a stored classification code then an alternative video signal is displayed. Elam, U.S. Patent No. 4,554,584 discloses a circuit for blanking the audio and video portions of a video signal in response to ASCII codes in line 21 of the video signal. Picture and sound are blanked whenever the received ASCII code matches or exceeds a value selected by the user. Lemelson, U.S. Patent No. 5,387,942 discloses a system for blocking the reception of television programming which parents deem inappropriate for their children. Lemelson's system includes a control unit responsive to 3-digit binary codes embedded in a received video signal. The digits indicate respectively whether or not the program content of the received video signals includes violence, coarse language or nudity. Other prior art systems and methods are disclosed in United States patents to: Chard 4,605,964; Olvio Jr., 4,888,796; Olvio Jr. 5,172,111; Kwoh et al. 5,382,983; Hunter Et al., 5,485,418; Banker et al. 5,477,262; Vogel et al., 4,930,158; Nafeh 5,343,251; Choi, 5,270,822; Keene 5,450,122; Vogel, 5,253,066; Vogel 5,371,795; Copriviza et al. 5,319,453; Graves et al. 5,410,344; Palmer. 5,195,135; Kamijyo,

5,053,884; Von Kohorn, 4,520,404; Hoffart, 5,341,216; Thomas et al. 5,425,100; Nadan 5,321,750; Hori, 5,386,240; Vogel, 5,446,488; Iggulden et al. 5,333,091; Robertson et al. 5,361,301; Kawashima et al., 5,307,165; Diehl et al., 5,373,557; Coutrot et al, 5,301,233; Sussman 5,369,440; and Minot et al. 5,455,892.

The inventor has recognized that the previous video blocking systems known to the inventor require a single consistent coding scheme to be used for all video programs. The prior art blocking devices must be constructed or initially programmed with advance knowledge of the coding scheme to be used. The advance knowledge must include what codes are used in the coding scheme and embedded in the incoming video signal and should also include the meanings of those codes. Further, such systems cannot readily provide selective blocking where different coding schemes are used on different programs or in different channels that may be received at one location. A further disadvantage of prior art video blocking systems is that, where different coding schemes are used in, for example, different geographical regions and a blocking device is moved from one region to another or where new coding schemes are introduced to replace or supplement existing coding schemes, then the prior art units must be rewired or reprogrammed. This is extremely expensive because very many blocking devices will be affected.

Summary of the Invention

One aspect of the invention provides a method for selectively blocking video signals. The method comprises the steps of: receiving a signal containing first configuration information, the first configuration information describing a first informational scheme, the first configuration information specifying, at least, numbers of levels in a first group of one or more multi-level categories of labels in the first informational scheme, storing the first configuration information in a memory, receiving a signal containing second configuration information, the second configuration information describing a second informational scheme, the second configuration information specifying, at least, numbers of levels in a second group of one or more multi-level categories of labels in the second informational scheme, and, storing the second configuration information in the memory; storing in the memory user preference information for each of the categories in each of the first and second informational schemes; receiving a first video signal

comprising embedded information specifying one of thefirst or second informational schemes, and current levels in each of the one or more categories in the specified informational scheme; extracting the embedded information and comparing the extracted information with the stored preference information for the specified informational scheme; if the result of thecomparison indicates that thefirst video signal should not be displayed, blocking thefirst video signal from being displayed on a video display; and, if the result of the comparison indicates that the first video signal should be displayed, allowing the first video signal to be displayed on the video display.

Another aspect of the invention provides apparatus for selectively blocking a video signal. The apparatus comprises: means for receiving configuration information, the configuration information comprising descriptive names for at least for at least either a multi-level category and a plurality of levels in the category or a plurality of labels; a memory; means for storing the descriptive names in the memory; means for displaying at least one of the descriptive names on a display, prompting a user to enter user preference information relating to the category corresponding to the at least one of the descriptive names while the at least one of the descriptive names is displayed on the display; means for accepting and storing the user preference information in the memory; means for receiving a video signal comprising a program and embedded program information about the program; means for extracting the program information from the video signal; comparison means for comparing the extracted program information to the stored user preference information; a switching means for blocking transmission of the video signal to a video display means; and means responsive to the comparison means for causing the switching means to block transmission of the video signal to the video display means whenever the comparison means detects that the program information corresponds to programs which the user preference information indicates are to be blocked.

Yet another aspect of the invention provides a video program transmission method for enabling a viewer to receive information useful for selectively blocking the viewing of television programming. The method comprises the steps of: transmitting a plurality of television channels to a viewer; for each said channel in a first group of one or more of said channels, embedding program information comprising at least a value representing a level in first multi-level category for a program being transmitted on said each channel,

said program information according to a first informational scheme; for each said channel in a second group of one or more of said channels, embedding program information comprising at least a value representing a level in second multi-level category for a program being transmitted on said each channel, said program information according to a second informational scheme; and, transmitting to said viewer first and second sets of configuration information, said first set of configuration information comprising at least a value representing a number of levels in said first multi-level category and descriptive names for said category and one or more of said levels in said first category according to said first informational scheme, said second set of configuration information comprising at least a number of levels in said second multi-level category and descriptive names for said second category and one or more of said levels in said second category according to said second informational scheme.

Still another aspect of the invention provides a method for transmitting a video signal. The method comprises the steps of: establishing an informational scheme, said informational scheme defining, at least, either a category comprising a graduated plurality of levels or one or more labels in one or more groups of labels; assigning one of said levels from said category and/or one or more labels from said one or more groups of labels to a program; transmitting a first video signal, said signal comprising said program and embedded information identifying said assigned level and/or said assigned one or more labels; and, simultaneously transmitting a signal comprising encoded configuration information, said configuration information comprising, at least, a descriptive name for each of said plurality of levels in said category or a descriptive name for each of said labels.

Brief Description of the Drawings

In drawings which illustrate non-limiting preferred embodiments of the invention,

Figure 1 is a block diagram showing video blocking apparatus of the invention connected between an incoming video signal and a television;

Figure 2 is a block diagram of video signal blocking apparatus according to the invention;

Figure 3 is a schematic diagram of a data structure for storing configuration information according to a preferred embodiment of the invention;

Figures 4A and 4B are tables illustrating the assignment of bits in embedded codes according to one embodiment of the invention;

Figure 5 is a pseudo code listing for a routine for receiving program information; and,

Figure 6 is an example of configuration information.

Detailed Description of Preferred Embodiments of the Invention

Program information describing characteristics of video programming being carried in a video signal **24** is encoded. The encoded information is embedded in video signal **24** by a broadcaster **26**. An apparatus **20** retrieves and decodes the embedded information. Apparatus **20** is in the signal path between the broadcaster **26** and a viewer's television video display **22**, which may be a television monitor. If the decoded information matches user preferences stored in a memory in, or otherwise accessible to, apparatus **20** then apparatus **20** blocks the video component of video signal **24** from being displayed on video display **22** and also preferably blocks any audio component of video signal **24** from being played. This provides the viewer, or the viewer's parent or guardian, with control over the television programming that the viewer can be exposed to. In the alternative, apparatus **20** may permit viewing of video signal **24** only if the decoded information matches certain stored user preferences. A user can interact with apparatus **20** through an input means, for example, an infrared remote control **21**.

Incoming video signal **24** may be delivered to apparatus **20** by satellite, by cable, by VHF or UHF broadcast or in any other suitable way. Incoming video signal **24** may also be the output from a video playback device, for example, a video cassette recorder ("VCR"), a laser disk player, or a digital video disc. In the latter case, the "broadcaster" **26** is the party who provided the recorded signal together with encoded information which is played back to create incoming video signal **24**.

Apparatus **20** is preferably built into a television set **22** but may also be provided as a stand-alone unit. Where apparatus **20** is provided as a stand-alone unit suitable locking means are provided to prevent the operation of apparatus **20** from being frustrated by bypassing apparatus **20**.

As shown in Figure 2, apparatus **20** has inputs **32** for one or more signals, such as composite audio and video signals, which comprise incoming video signal **24**. Inputs **32** may be connected, for example, to the audio and video outputs from a VCR, a television

tuner, or a cable converter. Inputs 32 are preferably buffered to prevent unnecessary loading of the source of video signal 24. Apparatus 20 also has an output 34 which may be connected to the video input of a television set. Switching means 36 and 38 are connected between inputs 32 and output 34. Separate outputs (not shown) for composite video and composite audio and/or other signal format(s) may also be provided in addition to or instead of a single output 34.

When apparatus 20 is not blocking a signal then switching means 36 and 38 are in a non-blocking or "ON" state so that video from inputs 32 passes through switching means 36 and 38, through rf modulator 39 and out of output 34. RF modulator 39 combines the audio and video signals from inputs 32 into a rf signal which can be received by a standard television set. Switching means 36 and 38 are preferably electro-mechanical relays or electronic switches but may be any other switching means capable of preventing incoming video signal 24 at inputs 32 from being passed to output 34 in a form capable of being viewed on the screen of television 22. Switching means 36 and 38 may even be switchable filters or other apparatus which can selectively degrade signal 24, or add noise to signal 24, to the point that signal 24, is no longer capable of being viewed on the screen of television 22 when it exits apparatus 20 if switching means 36 and 38 is in its blocking or "OFF" state.

When apparatus 20 detects one or more embedded codes in video signal 24 that represent information which indicates that video signal 24 should be blocked then apparatus 20 turns switching means 36 and 38 OFF, as described below, thereby preventing video signal 24 from reaching output 34. When video signal 24 is being blocked, video switching means 38 may connect to an alternative video signal, for example a signal containing a graphic which indicates that video signal 24 is being blocked. The graphic may optionally provide details about the program being blocked, such as its title etc. Preferably switching means 36 and 38 are OFF when apparatus 20 is not powered so that the operation of apparatus 20 cannot be defeated by disconnecting apparatus 20 from its power source.

Information about the program content of a received video signal is preferably encoded and encoded as digital data packets which are transmitted with the video signal.

The data packets are inserted by broadcaster **26** or by a cable company who retransmits video signal **24**.

In the preferred embodiment of the invention, the data packets are embedded in video signal **24** by transmitting them during the video blanking interval of video signal **24**. In North America, the video blanking interval comprises lines 10 through 21 of a video signal. Most preferably, the data packets each comprise data bytes transmitted in the Extended Data Services ("XDS") portion of a video signal. XDS data is transmitted in line 21 of the video signal as defined by Electronic Industries Association specification No. EIA-608. It will be readily apparent to those skilled in the art that the invention could be practised with other protocols and/or by encoding and embedding any necessary data in video signal **24** using other encoding and/or embedding techniques. The incoming video signal **24** should have somehow embedded in it codes which convey at least some of the information described below.

Encoded information about a program ("program information") may include category information, which identifies a level assigned to the program in each of one or more categories. An example of a category is a "Rating" category. Each program may be assigned a rating which ranges from, for example, "Exempt" to "X-Rated" through a series of intermediate levels. In a preferred embodiment of the invention, the current program is rated in each of three categories. The categories respectively assign levels to the program in respect of its degrees of violence, sexuality and coarse language.

It is generally desirable to provide category information on a graduated scale in which the lowest level of the scale describes unoffensive program content and the highest level of the scale indicates program content that many viewers could find highly offensive. Between the highest and lowest levels on the scale are intermediate levels. Most preferably each scale contains between 3 and 7 levels. This provides sufficient flexibility and yet minimizes the amount of effort required for broadcaster **26**, or a rating organization, to assign a level or levels to the program in each category. A scale containing 3 to 7 levels is not overly complicated for a viewer to understand and set up. Preferably, apparatus for use in the invention should be capable of accommodating informational schemes which include as many as 16 categories, each category having as many as 16 levels.

Information about a program may also be provided in the form of label information which may be used to indicate whether certain subject matter is present in the program. For example, labels may include things such as "Action", "Drug-use", "Adult", "Talk-show" etc. Different groups of labels may describe different aspects of a program or may contain labels assigned by different rating organizations. One program may simultaneously have several "labels" associated with it by broadcaster **26**. For example, a cartoon about a gruesome mass murderer might have the following labels which describe the type of program in video signal **24**: "ANIMATED", "HORROR", "CRIME", and "DRAMA". Other labels describing the program could optionally be embedded in video signal **24** and encoded in an ADVISORY group of labels. For example, a broadcaster **26** could assign key phrases, such as "rape scene", "strong action violence", "strong sexuality", "gory violence", or "brief partial nudity", where appropriate, to a television program. Labels are descriptive and are therefore relatively easy for a user to understand when the user is deciding what labels should cause apparatus **20** to block a video signal **24**. The text of the labels is downloaded to apparatus **20** and stored when apparatus **20** is configured, as described below.

In this application, the term "informational scheme" means a set of kinds of information that may be transmitted about a program, a set of values that may be transmitted for each different kind of information and the meanings of those values. An informational scheme may include one or more groups of labels and/or one or more categories.

Table I illustrates a combination of four categories that could make up an informational scheme to be applied to television programs broadcast by a broadcaster. Information for this informational scheme could be transmitted in two 7-bit characters. Only 3 bits are required to specify a level in each 6-level category because a 3-bit binary number has 8 possible values.

TABLE I - EXAMPLE OF AN INFORMATIONAL SCHEME WITH 4 CATEGORIES				
DATA	RATING (c)	VIOLENCE (v)	LANGUAGE (l)	SEXUALITY (s)
0	Exempt	none	none	none
1	General	comedic	suggestive	mature themes
2	PG	mild	mild	brief nudity
3	Adult	brief	coarse	mild sexuality
4	Restricted	strong	strong	full nudity
5	X-Rated	graphic	explicit	sexual activity

The category information of Table I may be encoded in two 7-bit characters, char1 and char2. For example, this may be done as shown in Figure 4A. v2, v1 and v0 are the values of the three bits which indicate the level in the violence category of violence in the program; s2, s1 and s0 are the values of the three bits which indicate the level in the sexuality category of sexuality in the program; l2, l1 and l0 are the values of the three bits which indicate the level in the language category of coarse language in the program; and c2, c1 and c0 are the values of the three bits which indicate the level in the rating category of the rating for the program. Each of char1 and char2 has a value between 40h and 7Fh. For example, program information according to the informational scheme of Table I for a program rated "PG" (c=2) with comedic violence (v=1) suggestive language (l=1) and brief nudity (s=2) would have bits allocated to char1 and char2 as shown in Figure 4B.

Each different type of embedded code may, if desired, be transmitted by broadcaster **26** at a different rate. In general, program information should be repeated at least about every 2-4 seconds.

The amount of data that must be transmitted to describe a program can be reduced by transmitting information, such as labels which are selected from a predefined list, by transmitting only an index which identifies the position of the label in the list. For example; if in a group of labels "Action" is the tenth label, then the label "Action" can be transmitted by setting the tenth bit in a block of transmitted data or by otherwise transmitting data representing the index "10" (which can be encoded as one character or

less) instead of the string "Action" (which occupies 6 characters). If the program information includes category information relating to one or more multi-level categories of multi-level information which can have one of several levels then it is only necessary to transmit an integer indicating the current level for the current program, as described above. It is not necessary to transmit the descriptions for each different level in the category or the current level in the category.

There are many possible informational schemes. It is certain that there will not be universal agreement on one informational scheme for use in all places by all broadcasters. Consequently, apparatus **20** is preferably flexible and needs little or no physical modification to adapt to new informational schemes that apparatus **20** may encounter. Preferably apparatus **20** includes a programmed computer so that apparatus **20** may be reconfigured by changing software.

As data packets are received in apparatus **20** they are detected by data slicer **40** which may be, for example, a 86129 data slicer and on screen display chip available from Zilog Corporation. In the preferred embodiment of the invention data slicer **40** is a line 21 decoder. Data slicer **40** is connected to video input **22** and monitors received video signal **23** for embedded data.

The operation of apparatus **20** is coordinated by a microprocessor **42**, which runs a software program **54** stored in a memory accessible to microprocessor **42** such as ROM **43**. Microprocessor **42** may, for example, be a Motorola 6805 microprocessor. Of course, those skilled in the art will readily understand that the functionality described herein can be achieved through the use of different components. The particular circuitry associated with microprocessor **42**, and the circuitry for interfacing microprocessor **42** to other devices, such as ROM **43** and the other parts of apparatus **20** can have many variations. Those skilled in the art will understand how apparatus **20** could be constructed in light of this disclosure and general knowledge in the industry. The detailed circuitry of apparatus **20** is therefore not described herein.

Each time data slicer **40** detects and decodes a character in the received video signal it transmits the character to microprocessor **42** over data bus **44**. Microprocessor **42** processes the information received from data slicer **40**. For example, the receipt of a character may trigger an interrupt in microprocessor **42**. Triggering the interrupt causes

microprocessor 42 to execute a routine which interprets the received character. The pseudo code of Figure 5 illustrates the operation of the interrupt handler routine. In pseudo-code in this application: get(operand1, operand2) is a function that fetches data from either the IR receiver 65 or data slicer 40. Operand 1 specifies the type of data that is expected. The retrieved data is stored in the variable identified by operand2; convert(time_of_day) converts a string of 4-6 characters which represents the time of day and converts it into a number in the range of 1 to 1440 representing the minute in the day; and parse() is used to parse incoming classification information and is described more fully below.

As data packets are received by data slicer 40 and transmitted to microprocessor 42, a software routine parses the retrieved data and stores the received data in memory locations 52 in memory 46 according to the data identifier in the encoded information. Memory 46 may be any suitable data storage means but is preferably non-volatile RAM memory such as FRAM.

Each time an embedded code data packet is received, microprocessor 42 simply determines what type of information is stored in the received data packet and overwrites the memory location(s) 52 corresponding to that type of information with the data in the received data packet. Microprocessor 42 may use configuration information stored in apparatus 20 which specifies how the encoded information is organized in the received data packet to separate different types of information stored in the data packet before storing the information in appropriate memory locations 52.

Apparatus 20 has stored in it configuration information which identifies the number of multi-level categories and the number of labels being used. If, for example, the configuration information indicates that there are 5 categories, then apparatus 20 treats the first 3 characters in the data packet as being category information (5 categories each having 8 levels or less can be encoded in 3 bytes as described above) and the rest of the characters in the data packet are treated as specifying labels.

If a broadcaster 26 transmits at least one of each type of embedded code about every 2 to 4 seconds then the data stored in memory locations 52 will not be more than about 4 seconds old. The content of embedded codes could change throughout a television program to permit blocking of certain offensive scenes only.

Because embedded codes do not need to be transmitted at specific times, the embedded codes can be transmitted when space is available. If the embedded codes are being transmitted in line 21 of an incoming video signal 24 and other data is also being transmitted on line 21 (for example captions) then the embedded codes can be buffered. If line 21 of the video signal is full in one frame of the video signal then the embedded codes which were ready to be transmitted with that frame can be saved and transmitted in line 21 of one or more subsequent frames of the video signal. This guarantees that the embedded codes do not interfere with the transmission of other data in line 21 of the video signal.

While a user is watching television 22 then microprocessor 42 runs a main software program 54. Under the control of software program 54, microprocessor 42 compares the data stored in memory locations 52 with corresponding user preference information stored in, or loaded from, memory locations 56 in non-volatile memory 58. Any suitable compatible non-volatile memory, for example, flash RAM ("FRAM"), electrically erasable programmable ROM ("EEPROM") or a suitable magnetic or other storage medium, may be used for non-volatile memory 58.

When program 54 detects that memory locations 52 contain data which is outside the bounds prescribed by the corresponding memory locations 56 then program 54 causes microprocessor 42 to turn switching means 36 and 38 OFF. When switching means 38 is turned OFF it optionally connects an alternative video signal, such as a display created by an on screen display generator 60, to output 34. The display may provide information from memory locations 52 about the program which is being blocked.

An on screen display generator 60 is commonly incorporated on a single chip with a data slicer 40. On screen display generator 60 can generate and display on the screen of television 22 displays which, for example, provide information about a current program, indicate that a program is being blocked, indicate the current configuration of apparatus 20, and/or guide a user in setting up and configuring apparatus 20.

Apparatus 20 includes user interface means, which allows a user to send information to apparatus 20. In the currently preferred embodiment of the invention, the input means includes an infrared remote control transmitter 21 which transmits control signals to an infrared receiver 65 in apparatus 20. When infrared receiver 65 receives a

control signal from infrared transmitter 21 it interrupts processor 42. Software running in processor 42 can then retrieve and interpret the transmitted information and take any action necessary, such as displaying a menu to allow the user to enter new user preference information.

Preferably a user can override the blocking function of apparatus 20 by entering a password, or identification number, ("PIN"). This permits those who know the PIN to watch an individual television program that apparatus 20 is configured to block without reprogramming apparatus 20. At the end of the program (or after a time period) apparatus 20 resumes its normal function. Apparatus 20 can detect when a program is over by monitoring data packets containing the title or identification number for the current program.

Apparatus 20 must be able to recognize the various information that is encoded and embedded in video signal 24. If all programming were described everywhere according to a universal informational scheme, which never changed, then apparatus 20 could be preprogrammed to recognize all of the types of information about video signal 24 in that universal scheme. It is highly unlikely that a universal rating scheme could be agreed upon. People in different countries, and even people in different parts of the same country have differing views regarding what information is appropriate for selecting programming to view and what type of subject matter might be considered to be offensive. Consequently, the invention provides a method and apparatus to remotely configure apparatus 20 to accommodate new schemes for selecting and transmitting information about video signal 24 that may be introduced to augment or replace existing schemes. This makes it unnecessary to physically alter apparatus 20 if a new informational scheme is adopted.

Broadcaster 26 transmits configuration information which describes the scheme of information about video signal 24 used by broadcaster 26. The configuration information is preferably encoded and embedded in video signal 24 in the same manner as the codes which contain information about video signal 24 are encoded and embedded. When configuration information is received by apparatus 20 it is identified as such by, for example, its XDS data type. The configuration information identifies: the number of categories (0 or more) and the number of levels within each category in the informational

scheme; the number of groups of labels (0 or more) and the number of labels in each group. This information is used by apparatus **20** to allocate locations in non-volatile memory **58** to store user preference information corresponding to each category and each group of labels in the informational scheme. The information is also used when apparatus **20** is initialized to allocate memory locations **52** in RAM **46** to store the received category information and label information.

Preferably the configuration information also identifies the name of the informational scheme, and the names of the different categories of multi-level information in the informational scheme (e.g. violence, sexuality, language etc.); descriptive labels for each level within each category (e.g., for the violence category: none, comedic, mild, brief, strong, graphic etc.); and some or all of the descriptive labels used in the informational scheme. This information can be provided to a user to assist the user in providing user preference information for storage in apparatus **20**. In general, it is easier for a user to select between blocking programming in which the level of violence is "strong" or "graphic" than it is to select between levels "4" and "5". Configuration information may be transmitted in a separate channel so that it does not interfere with program related information.

Apparatus **20** can be configured by tuning to the channel containing configuration information and initiating the configuration process (by, for example, selecting a menu option or pushing a control button). An unskilled user can therefore easily initiate a process for reconfiguring apparatus **20** to accommodate changes to the informational scheme in the user's area or to accommodate a different informational scheme which is used in a new area to which the user moves.

The configuration information received by apparatus **20** may describe all of the categories and labels in the informational scheme being used. In the alternative, to minimize the amount of configuration information which is required, the configuration information may specify only additions to a basic informational scheme, such as the scheme specified by EIA-608.

The apparatus and methods described herein assume some knowledge about how any additional category information and/or label information will be encoded. For example, if category information is encoded and embedded in an XDS data packet, as

described above, then new categories may be added simply by adding new characters (up to the maximum number of characters allowed in a data packet which is currently 32 characters) to the XDS data packet. The configuration information could include information about how additional information will be encoded and/or embedded. For example, configuration information could include a data type character which is used to identify additional category and/or label information in data packets sent in the "Undefined" class specified by EIA-608.

Configuration Example

In this example, category and label information is transmitted in a single XDS data packet. Category information for a number of categories is transmitted first (with information about two categories transmitted in each 7-bit character as described above) followed by label information (with one character specifying a label). The characters used to specify label information are in the range 20h to 3Fh. The character 20h specifies the first label, the character 21h specifies the second label, and so on. An XDS data packet can contain up to 32 characters so, if 4 characters are used to transmit category information, then 28 characters are available for transmitting label information.

Apparatus 20 receives configuration information which specifies, inter alia, the number of characters in the data packet that contain category information and the number of characters that contain label information.

Configuration information may be transmitted in the XDS undefined class (start character 0Dh) in type 05h (type character 05h). The first character following the start character and the type character indicates whether the data which follows is the name of a category or the name of a group of labels. For example, the character 7Eh could indicate a category name and the character 7Fh could indicate the name for a group of labels. In this example, the rating scheme includes: 4 categories of category information - rating, violence, sexuality and language - each having levels described as in Table II, and a group of eight labels or "keywords" for describing program content -Action, Sexuality, Mild Action, Language, Family, Mature Content, Graphic Violence, and Nudity.

In this example, the informational scheme includes both category information and label information. Configuration information about the categories in the scheme is sent first, followed by configuration information about the labels in the scheme. Apparatus 20

can locate the beginning of the configuration information by looking for the first 7Eh identifier to follow a 7Fh identifier. The configuration information may, for example, be transmitted as shown in Figure 6.

As each category name is received, microprocessor **42** stores the category name in memory **58**. Microprocessor **42** then stores the names of the levels in that category in memory **58**. Microprocessor **42** counts the number of categories and the number of levels in each category and stores these numbers in memory **58**. When microprocessor **42** detects the identifier 7Fh then it stores the information in that packet as a label group name. If there are no labels in the informational scheme then the label group name can be set to a value such as NULL (00h) to indicate that there are no labels. Microprocessor **42** receives and stores the names for the labels. In this example, the first label name corresponds to character 20h, the second label name corresponds to the character 21h, the third label name corresponds to the character 22h, and so on.

In the example there are 4 categories and 8 labels. This means that the first 2 characters in a data packet containing this information specify category information. Up to eight more characters may specify label information.

When the configuration process is started and microprocessor **42** detects configuration information then microprocessor 42 stores the configuration information in non-volatile memory **58**.

The architecture of apparatus **20**, which is described above, permits an easy to use user interface. In the currently preferred embodiment of the invention the user interface includes an infrared receiver **70** and an on screen display generator **60** both connected to microprocessor **42**. The user can set the user preferences stored in apparatus **20** by making selections with an infrared remote control transmitter **21** and confirming the changes by viewing the display generated by on screen display generator **60** on the screen of television **22**.

Much of the data encoded and embedded in incoming video signal **24** is of interest to viewers. For example, a viewer may be interested in knowing the title of the current television program, how iong the current program has left to run etc. Preferably infrared remote control transmitter **21** includes a key which, for a short period, displays the title of the current program together with other information about the current program. This

information is stored in memory **46** in apparatus **20**. It is therefore trivial to cause microprocessor **42** to send this information through on screen display driver **60** for display on the screen of television **22**.

Preferably the system of menus in the user interface is no more than 3 levels deep and permits access to the most often used functions of apparatus **20** with a minimum number of key strokes. The techniques for setting user preferences by means of an infrared remote control are well known and are widely used, for example, in programming VCRs. These well known techniques are therefore not described here in detail.

Apparatus **20** includes means for receiving user preference information from a user. The user preference information specifies values for various parameters that affect the operation of apparatus **20**. The values that the user selects for these parameters comprise preference information which is stored in memory locations **56** in non-volatile memory **58** and used, as described above, to determine whether or not a received video signal **24** will be blocked by apparatus **20**. For example, a user can choose thresholds in the various categories in the informational scheme(s) for which apparatus **20** is configured by, for example, pressing a button on remote control transmitter **21** to cycle through the available levels. The categories correspond to embedded codes containing category information that might be present in incoming video signal **24**.

The user is assisted in setting threshold levels because the descriptive names for the categories, as well as descriptive names for each level in each category are preferably displayed on a display, for example screen **22**, while the user is entering user preference information. These descriptive names are part of the configuration information according to which apparatus **20** is preferably configured. If apparatus **20** is reconfigured for use with a different rating scheme then apparatus **20** will display category names and category level descriptions according to the new rating scheme while the user is entering user preference information.

After a user has selected thresholds for each category, the currently set threshold level for each category is stored as preference information in non-volatile memory **58**. This can be done, for example, when the user exits a menu. Apparatus **20** will block incoming video signal **24** whenever incoming video signal **24** has an embedded code containing category information identifying a level in a category which equals or exceeds the value

of the threshold level for that category (which is stored a memory location 56 for that category in non-volatile memory 58). It can be readily appreciated that apparatus 20 can simultaneously accommodate multiple categories and can be set to block an incoming signal 24 that meets or exceeds a threshold level set for any one category.

The ability to simultaneously handle multiple informational schemes is useful because of the many sources of television programming. Television programming which originates in one country from a first broadcaster may be rated according to a first rating scheme. Television programming which originates in a second country from a second broadcaster may be rated according to a second informational scheme.

Preferably apparatus 20 should be able to accommodate multiple informational schemes. This can be achieved, in general, by transmitting with program information data which indicates which one of several (for example, up to 8 or 16) informational schemes has been used to prepare the program information in respect of the program being received. Each informational scheme may have a different number of multi-level categories, different numbers of levels in the categories, and different meanings for the categories and the levels within the categories.

After detecting which informational scheme is in use for a program, apparatus 20 can parse the program information being received according to the structure of the current informational scheme and compare the parsed data to stored user preference information for that informational scheme to determine whether or not to block reception of the program being received.

The following example illustrates an embodiment of the invention capable of dealing with up to 8 informational schemes. Where 8 informational schemes are used then 3 bits are necessary to specify which one of the 8 schemes is in effect for a given program. In this embodiment of the invention, a frequently repeated program rating ("PR") data packet (which may be, for example, an XDS data packet in the XDS current class, type 05h) identifies the informational scheme being used and specifies the values for levels in each category in that scheme. A sequence of program rating configuration and control ("PRCC") packets (which may be XDS data packets in the XDS undefined class type 05h) is used to download configuration information for the informational scheme to apparatus 20.

Preferably, the values chosen to represent levels in individual categories in the different informational schemes are selected to facilitate mapping between different informational schemes. This makes it possible for apparatus **20** to easily set default user preference information for other informational schemes after a user selects user preference information for one informational scheme. For example, Table II shows how the age rating levels of the current U.S. (MPAA) system, the Canadian (pay-TV) and Quebec (Regie du Cinema) systems could be encoded to facilitate mapping between them.

TABLE III

"Level"	MPAA	Pay-TV	Regie du Cinema
0			
1	G	G	G
2	PG		
3	PG-13	PG (13+)	13+
4	R(16+)	A (16+)	16+
5	NC	R(18+)	18+
6	X		
7			

For example, a user could select "PG-13" in the MPAA system so that all programming with a higher rating in the age category than PG-13 would be blocked. If the user had not set any preferences for the Pay-TV scheme or the Regie du Cinema scheme then the system would default to PG(13+) in the pay-TV scheme and 13+ in the Regie du Cinema scheme. The mapping is easily accomplished because all of these age levels are identified as level "3". Similar mapping can be done for levels of violence, sexuality etc. when such categories are present in more than one scheme. Not all schemes have all levels defined. For example, in the Pay-TV scheme of Table IV, level "2" is not defined. Consequently, the age rating "PG" in the MPAA scheme, which corresponds to level "2", would be mapped to the age rating G in the Pay-TV scheme, which corresponds to level "1" (i.e. the closest valid age rating which corresponds to the same or a lower level).

In a currently preferred embodiment of the invention, the PR packet consists of a series of one or more non-ASCII 7-bit characters (in which the highest order bit, bit 6, is set high). Each character can therefore carry 6 bits of information. The first field of 1 to 4 bits of the PR packet identifies the informational scheme to which the remaining information in the packet relates. The second field of 1-4 bits is the current value for a level in an "age" category. The next field of 1-4 bits is the current value for a level in a "violence" category (if the informational scheme has such a category). Additional fields of 1-4 bits each can specify the current value for a level in additional categories.

The PR packet is preferably short enough so that it can be retransmitted frequently enough to provide quick blocking if a value in a category changes to exceed the value specified by the user. Where the PR packet is transmitted as XDS data then the PR packet must be 12 characters or less in length (which can contain 68 bits of data plus a checksum) and should most preferably be only 2 to 4 characters long. A useful informational scheme might have a PR packet as follows: 3 bit "system" field which identifies one of eight informational schemes; 3 bit "age" category information (to specify one of up to 8 levels); 2 bit "violence" category information (to specify one of up to 4 levels); 2 bit "language" category information (to specify one of up to 4 levels); and, 2 bit "sexuality" category information (to specify one of up to 4 levels). The PR packet in informational schemes which have this structure may contain only 12 data bits.

Configuration information about the informational scheme being used may be transmitted in PRCC packets. In general, the configuration information should preferably be completely transmitted at least once every 10 minutes. Because it is not desirable for packets to be very long it is desirable to break up the configuration information for an informational scheme into a sequence of several PRCC packets. It is convenient to divide the configuration information for an informational scheme into "system" information, "category configuration" information, and "level configuration" information. System information includes basic information about the informational scheme such as the name of the informational scheme, the number of categories in the informational scheme and the number of bits used to define the system field. Category information includes information about categories such as the name of each category, the number of bits used to define each

category, and the number of levels in the category. Level information included information about individual levels in a category such as the name of each level.

For example, suppose an informational scheme called "HBO" provides the categories and levels shown in Table III. We shall assume that there are 8 or fewer informational schemes in use. Therefore, 3 bits can specify one of the informational schemes. The informational scheme of Table III may, for example, be assigned the number 2.

TABLE III - EXAMPLE INFORMATIONAL SCHEME

Level	Age Rating	Violence	Language	Sexuality
0	Exempt	None	None	None
1	G	Mild	Adult	Brief Nudity
2		Violent		Adult Content
3	PG	Graphic	Graphic	Sexual Content
4	PG-13			
5	R			
6	NC-17			
7				

According to this scheme, a program which was rated PG-13, had "Mild" violence and "Brief Nudity" could be described by a PR packet containing the bit string: 010100010001. The first 3 bit field of the bit string contains 010b which indicates that this packet contains information according to informational scheme "2". The next 3 bits, 100, indicate that the rating for the program is level 4 (which corresponds to PG-13 as shown in Table V). The next 2 bits, 01, indicate that the program has violence of level 1 (Mild violence). The next 2 bits, 00, indicate that the language in the program is level 0 (None). The final 2 bits 01, correspond to sexuality level 1 (Brief Nudity). This bit string would be transmitted in a PR packet as [Current Class 01h, Type 05h, 54h, 51h, Terminator 0Fh, Checksum] as the following string of characters: [01h, 05h, 54h, 51h, 0Fh, Checksum].

Where the description of an informational scheme is provided in several PRCC packets of different types then each PRCC packet should include a field which identifies its type. Where there are 3 types of PRCC packet, as described above, then 2 bits suffice to identify the type of PRCC packet. For example, "system", "category" and "level" type PRCC packets could be identified by types 0, 1 and 2 respectively.

A "system" type PRCC packet for the informational scheme of Table V could, for example, contain the following fields: TYPE field (2 bits) containing 00b to indicate that this packet is a "system" type packet; NUMBER field (4 bits) containing the number of the informational scheme, in this case 0010b for scheme 2; a BITS field (2 bits) containing the number of bits that are significant in the NUMBER field (in this case the BITS field contains 2 (010b) which allocates 3 bits in the System field. This means that up to 8 informational schemes can be defined) and a CATEGORIES field (4 bits) containing the number of categories in the informational scheme (in this case 4). The PRCC packet also contains the name of the informational scheme. The binary data in this system type PRCC packet requires 12 bits and can therefore be transmitted as 2 non-ASCII characters in an XDS data packet. The name of the informational scheme can be transmitted as a string, for example a string of ASCII characters, after the data carrying characters. For example, if the name of the scheme of Table III was "HBO" then the name "HBO" would be transmitted in the system type PRCC packet.

The system type PRCC packet optionally and preferably contains a revision code which is changed each time the information conveyed by the PRCC packets changes. For example, the revision code could be contained in a character transmitted immediately before the character string containing the name of the informational scheme. Apparatus 20 can monitor the revision code. If apparatus 20 has already received a complete PRCC packet sequence corresponding to that revision code then it is not necessary for apparatus 20 to parse the PRCC packets being received because the information contained in those packets has previously been received and stored in apparatus 20.

Information about the categories in the system is transmitted in category type PRCC packets. A category type PRCC packet for the informational scheme of Table V could, for example, include the following fields: a type field (2 bits) containing the value 01b to indicate that this is a category type PRCC packet; a NUMBER field (4 bits)

containing the number of the category described by the packet, as the age rating category is the first category in the scheme of Table III it could be identified by the value 0000b in the NUMBER field, the violence category could be identified by the value 0001b in the NUMBER field and so on; a BITS field (2 bits) containing a number representing the number of bits in the category (e.g. 3 for the age rating category); an ELEMENTS field (4 bits) specifying the number of levels that are defined in the category (for example, while the rating category could have up to 8 levels, only 6 levels are defined). Since every category must have at least one level, the value 0000b in the binary field could specify one level, and so on. The data above takes up 12 bits and so can be transmitted as two characters. The category type PRCC packet also contains a string containing the name of the category. For example, the age rating category of Table V could have a category type PRCC packet containing two non-ASCII characters containing the bit string 010000100101b followed by the ASCII characters RATING. The category names should be reasonably short, for example, 16 characters or less long, both to conserve memory in apparatus 20 and to reduce the amount of data in the PRCC packets.

A "level" type PRCC packet is transmitted for each level in each category of the informational scheme. Each level type PRCC packet may, for example, include a binary string containing the following fields: a TYPE field (2 bits) containing the value 10b indicating that this is a level type PRCC packet; and a NUMBER field (4 bits) containing the number of the level in question. This binary information can conveniently be transmitted in 1 character. The level type PRCC packets also include a character string containing the name of the level. This character string can be transmitted immediately after the character containing binary information.

A sequence of PRCC packets that could be transmitted to specify the informational scheme of Table III is shown in Table IV. Each PRCC packet begins with the characters 0Dh 05h to specify the XDS undefined class and type. Each PRCC packet ends with the character 0Fh and a checksum character. The packets are conveniently sent in the order in which they are listed in Table IV.

TABLE IV

Packet Type	First Data Character	Second Data Character	ASCII String
System	42h	63h	HBO
Category	50h	66h	Rating
Level	60h		Exempt
Level	61h		G
Level	63h		PG
Level	64h		PG-13
Level	65h		R
Level	66h		NC-17
Category	51h	53h	Violence
Level	60h		None
Level	61h		Mild
Level	62h		Violent
Level	63h		Graphic
Category	52h	53h	Language
Level	60h		None
Level	61h		Adult
Level	63h		Graphic
Category	53h	53h	Sexuality
Level	60h		None
Level	61h		Brief Nudity
Level	62h		Adult Content
Level	63h		Sexual Content

Apparatus 20 can synchronize to the PRCC data stream by monitoring the PRCC packets until it receives a "system" type PRCC packet of which there is only one. The configuration data about the informational scheme that is maintained in memory in apparatus 20 is updated after the final PRCC level description in the final category has been received. The PRCC packets may be sent along with other XDS date at low priority so that the entire sequence of PRCC packets is transmitted at least as often as about every 10 minutes.

It is generally desirable to keep apparatus 20 simple, and therefore inexpensive because an apparatus 20 is preferably provided for each television set. Consequently, it is desirable to have an efficient way to store configuration information in apparatus 20.

The information transmitted in the PRCC packets described above can be stored in a data structure that is both compact and can be easily navigated. The preferred data structure 200 illustrated in Figure 3 makes use of headers, pointers and strings. Some records have been omitted from Figure 3 for clarity.

Data structure 200 begins with a record 210 which includes a header 211, a string 211 and a group of pointers 213. Header 211 comprises 6 bits, 2 bits which specify the number of bits needed to specify a particular informational scheme (3 bits for up to 8 informational schemes and 4 bits for up to 16 informational schemes), and 4 bits which specify the length of string 212. String 212 may be displayed to a user during the configuration process. Group 213 includes one pointer 215 for each possible informational scheme. For example, if header 211 specifies that the number if informational schemes is specified in 3 bits then there will be 8 pointers 215 in group 213. Pointers 215 which correspond to an informational scheme for which there is no stored configuration information in apparatus 20 may contain a specific value, for example, a null value. Pointers 215 should be large enough to point to the locations of records 220 as discussed below. For example, where it is possible that records 220 will be more than 256 bytes away, then pointers 215 should be 2 byte pointers.

When configuration information about an informational scheme is stored in data structure 200 then the corresponding one of pointers 215 points to a first record 220 describing that informational scheme. Record 220 comprises a header 221, a string 222 containing the name of the informational scheme, and a group 223 of pointers 225. Header 221 includes 4 bits containing the number of categories in the informational scheme, and 4 bits containing the length of string 222 which contains the name of the informational scheme. Group 223 contains one pointer 225 for each category in the informational scheme. Each pointer 225 points to a record 230 for the category corresponding to that pointer.

Records 230 each include a header 231, a string 232 containing the name of the category, and a group 233 of pointers 235. Header 231 includes 2 bits containing the number of bits used to specify levels in the category, and 4 bits containing the length of string 232 which contains the name of the category. Group 233 contains one pointer 325 for each possible level that could be specified with the number of bits recorded in header

231. Each pointer 235 points to a record 240 for the level corresponding to that pointer. If the informational scheme does not have a level corresponding to that pointer then the pointer points to the next lower level that does exist in the informational scheme. For example, in the informational scheme of Table III, the age rating category does not have a level with a value of 2. Consequently, as shown in Figure 3, the third pointer 235 points to the same record 240 as the second pointer 235.

Records 240 each contain a header 241 and a string 242 containing the name of the level which corresponds to that record. Header 241 contains 4 bits which indicate the value assigned to that level and 4 bits which specify the length of string 242.

By using a data structure 200 as shown in Figure 3, the configuration information for the informational scheme of Table III would include one record 220, four records 230 and 17 records 240. The data for the informational scheme would occupy only 185 bytes in data structure 200. If data structure 200 contained configuration information for 3 informational schemes of the same size as that of Table III then the entire data structure 200 would still occupy only 579 bytes. 579 bytes could be readily stored in a small memory such as a 1 kilobyte FRAM. Preference information could be stored in the same memory. If the preference information were stored in the same format as described above for a PR data packet then the preference information would occupy only 2 bytes for each informational scheme like the one of Table III.

Of course, the configuration information for an informational scheme could be broken up into packets and/or transmitted differently than is set out above. Different data structures could be used to store configuration information and preference information. What is described here is a currently preferred embodiment of the invention. Those skilled in the art will realize that the invention encompasses many variations of the system described above.

As will be apparent to those skilled in the art in the light of the foregoing disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope thereof.

I claim:

1. A method for selectively blocking video signals, said method comprising the steps of:

a) receiving a signal containing first configuration information, said first configuration information describing a first informational scheme, said first configuration information specifying, at least, numbers of levels in a first group of one or more multi-level categories of labels, in said first informational scheme, storing said first configuration information in a memory receiving a signal containing second configuration information, said second configuration information describing a second informational scheme, said second configuration information specifying, at least, numbers of levels in a second group of one or more multi-level categories of labels, in said second informational scheme, and, storing said second configuration information in said memory;

b) storing in said memory user preference information for each of said categories in each of said first and second informational schemes;

c) receiving a first video signal comprising embedded information specifying one of said first or second informational schemes, and current levels in each of said one or more categories in said specified informational scheme;

d) extracting said embedded information and comparing said extracted information with said stored preference information for said specified informational scheme;

e) if the result of said comparison indicates that said first video signal should not be displayed, blocking said first video signal from being displayed on a video display; and,

f) if the result of said comparison indicates that said first video signal should be displayed, allowing said first video signal to be displayed on said video display.

2. The method of claim 1 wherein receiving said first configuration information comprises tuning to a first television channel and receiving embedded information comprising said first configuration information.

3. The method of claim 2 wherein receiving said second configuration information comprises tuning to a second television channel and receiving embedded information comprising said second configuration information.

4. The method of claim 3 wherein said first configuration information comprises descriptive text for two or more levels in each of said first group of categories and said second configuration information comprises descriptive text for two or more levels in each of said second group of categories.

5. The method of claim 1 wherein said step of storing said user preference information comprises displaying on a display said descriptive text for labels in said first informational scheme and accepting from a user, and storing, user preference information for said first informational scheme said user preference information comprising a threshold level for each of said categories in said first informational scheme.

6. The method of claim 5 wherein said step of storing said user preference information comprises setting a threshold level for a first category in said second informational scheme to a value equal to a threshold level set for a first category in said first informational scheme.

7. The method of claim 5 wherein said step of storing said first configuration information comprises storing in a first record in said memory a pointer to a second record containing a name for said first informational scheme.

8. The method of claim 7 wherein said step of storing said first configuration information comprises storing in said second record pointers to a set of one or

more third records, each of said one or more third records containing a name of a category in said first informational scheme.

9. The method of claim 8 wherein said step of storing said first configuration information comprises storing in each of said third records pointers to a set of two or more fourth records, each of said two or more fourth records containing a name of a level in said category of said first informational scheme and a numeric value for said level.

10. A video program reception method comprising the steps of:

a) receiving configuration information describing an informational scheme, said configuration information specifying, at least: either a number of levels in each of one or more multi-level categories in said informational scheme; or a number of labels in one or more groups of labels in said informational scheme;

b) extracting said configuration information and allocating space in a memory means to store user preference information relating to each of said categories and labels;

c) receiving from a user a selection identifying at least either a level in a category or a label in a group of labels, and storing preference information identifying, at least, said selected one of said levels or said label in said allocated space in said memory means;

d) receiving a first video signal comprising embedded information identifying at least, a current level in said category or a label;

e) extracting said embedded information and comparing said extracted information with said stored preference information;

f) if the result of said comparison indicates that said first video signal should not be displayed, blocking said first video signal from being displayed on a video display; and,

g) if the result of said comparison indicates that said first video signal should be displayed, allowing said first video signal to be displayed on said video display.

11. The method of claim 10 wherein said configuration information comprises at least descriptive text for at least two or more levels in a multi-level category or a label in a group of one or more labels and said step of receiving from a user a selection identifying at least either a level in a category or a label in a group of labels comprises displaying said descriptive text on a display means.

12. The method of claim 11 wherein said informational scheme comprises a plurality of multi-level categories and said configuration information includes descriptive text for each of said categories and descriptive text for two or more levels in each category.

13. The method of claim 12 wherein said informational scheme comprises a plurality of labels and said configuration information comprises descriptive text for each of said labels.

14. The method of claim 12 wherein said configuration information is embedded in a second video signal.

15. The method of claim 14 wherein said first and second video signals comprise different channels delivered by a cable television network.

16. The method of claim 12 wherein said step of storing said preference information comprises storing information identifying a level in each of said categories.

17. A video program transmission method for enabling a viewer to receive information useful for selectively blocking the viewing of television programming, said method comprising the steps of:

a) transmitting a plurality of television channels to a viewer;

b) for each said channel in a first group of one or more of said channels, embedding program information comprising at least a value representing a level in first multi-level category for a program being transmitted on said each channel, said program information according to a first informational scheme;

c) for each said channel in a second group of one or more of said channels, embedding program information comprising at least a value representing a level in second multi-level category for a program being transmitted on said each channel, said program information according to a second informational scheme; and,

d) transmitting to said viewer first and second sets of configuration information, said first set of configuration information comprising at least a value representing a number of levels in said first multi-level category and descriptive names for said category and one or more of said levels in said first category according to said first informational scheme, said second set of configuration information comprising at least a number of levels in said second multi-level category and descriptive names for said second category and one or more of said levels in said second category according to said second informational scheme.

18. The method of claim 17 wherein said step of encoding and transmitting said configuration information comprises transmitting a separate data packet containing the name of each of said levels in said informational scheme to which said configuration information relates.

19. A method for transmitting a video signal comprising the steps of:

a) establishing an informational scheme, said informational scheme defining, at least, either a category comprising a graduated plurality of levels or one or more labels in one or more groups of labels;

b) assigning one of said levels from said category and/or one or more labels from said one or more groups of labels to a program;

c) transmitting a first video signal, said signal comprising said program and embedded information identifying said assigned level and/or said assigned one or more labels; and,

d) simultaneously transmitting a signal comprising encoded configuration information, said configuration information comprising, at least, a descriptive name for each of said plurality of levels in said category or a descriptive name for each of said labels.

20. The method of claim 19 further comprising the steps of: receiving said encoded configuration information at a receiver; extracting and storing said descriptive name for each of said plurality of levels in said category or said descriptive name for each of said labels, in a memory means at said receiver; and prompting a user to enter user preference information at said receiver while displaying on a display means said descriptive name for at least one of said levels or said descriptive name for at least one of said levels.

21. A video program reception method comprising the steps of:

a) receiving configuration information describing an informational scheme, said configuration information specifying, at least, either a number of levels in one or more multi-level categories or a number of labels in one or more groups of labels, in said informational scheme;

b) extracting said configuration information and allocating space in a memory to store user preference information relating to each of said categories and labels;

c) receiving from a user a selection identifying at least either a level in a category or a label in a group of labels, and storing in said allocated space in said memory means preference information identifying, at least, said selected one of said levels or said label;

d) receiving a first video signal comprising embedded information identifying at least, a current level in said category or a label;

e) extracting said embedded information and comparing said extracted information with said stored preference information;

f) if the result of said comparison indicates that said first video signal should not be displayed, blocking said first video signal from being displayed on a video display; and

g) if the result of said comparison indicates that said first video signal should be displayed, allowing said first video signal to be displayed on said video display.

22. A method for transmitting and receiving a video program, said method comprising the steps of:

a) establishing an informational scheme, said informational scheme defining a category comprising a graduated plurality of levels;

b) transmitting a signal, said signal comprising configuration information, said configuration information comprising, at least, a descriptive name for each of said plurality of levels in said category;

c) receiving said signal at a receiver and storing said configuration information;

d) accepting and storing user preference information, said user preference information identifying one of said plurality of levels in said category, while displaying said descriptive name for said one of said plurality of levels on a display;

e) assigning one of said levels from said category to a program;

f) transmitting video signal, said signal comprising said program, and embedded information identifying said assigned level;

g) extracting said embedded information and comparing it to said user preference information;

h) if the result of said comparison indicates that said video signal should not be displayed, blocking said video signal from being displayed on a video display; and.

i) if the result of said comparison indicates that said video signal should be displayed, allowing said video signal to be displayed on said video display.

23. A method for transmitting and receiving a video program, said method comprising the steps of:

a) establishing an informational scheme, said informational scheme defining a plurality of labels;

b) transmitting a signal, said signal comprising configuration information, said configuration information comprising, at least, a descriptive name for each of said plurality of labels;

c) receiving said signal at a receiver and storing said configuration information;

d) accepting and storing user preference information, said user preference information identifying at least one of said plurality of labels, while displaying said descriptive name for said at least one of said plurality of labels on a display;

e) assigning at least one of said labels to a program;

f) transmitting a video signal, said signal comprising said program, and embedded information identifying said at least one assigned label;

g) extracting said embedded information and comparing it to said user preference information;

h) if the result of said comparison indictates that said video signal should not be displayed, blocking said video signal from being displayed on a video display; and,

i) if the result of said comparison indicates that said video signal should be displayed, allowing said video signal to be displayed on said video display.

24. Apparatus for selectively blocking a video signal, said apparatus comprising:

(a) means for receiving configuration information, said configuration information comprising descriptive names for at least for at least either a multi-level category and a plurality of levels in said category or a plurality of labels;

(b) a memory;

(c) means for storing said descriptive names in said memory;

(d) means for displaying at least one of said descriptive names on a display, prompting a user to enter user preference information relating to said category corresponding to said at least one of said descriptive names while said at least one of said descriptive names is displayed on said display;

(e) means for accepting and storing said user preference information in said memory;

(f) means for receiving a video signal comprising a program and embedded program information about said program;

(g) means for extracting said program information from said video signal;

(h) comparison means for comparing said extracted program information to said stored user preference information;

(i) a switching means for blocking transmission of said video signal to a video display means; and

(j) means responsive to said comparison means for causing said switching means to block transmission of said video signal to said video display means whenever said comparison means detects that said program information corresponds to programs which said user preference information indicates are to be blocked.

25. Apparatus for selectively blocking a video signal substantially as described herein.

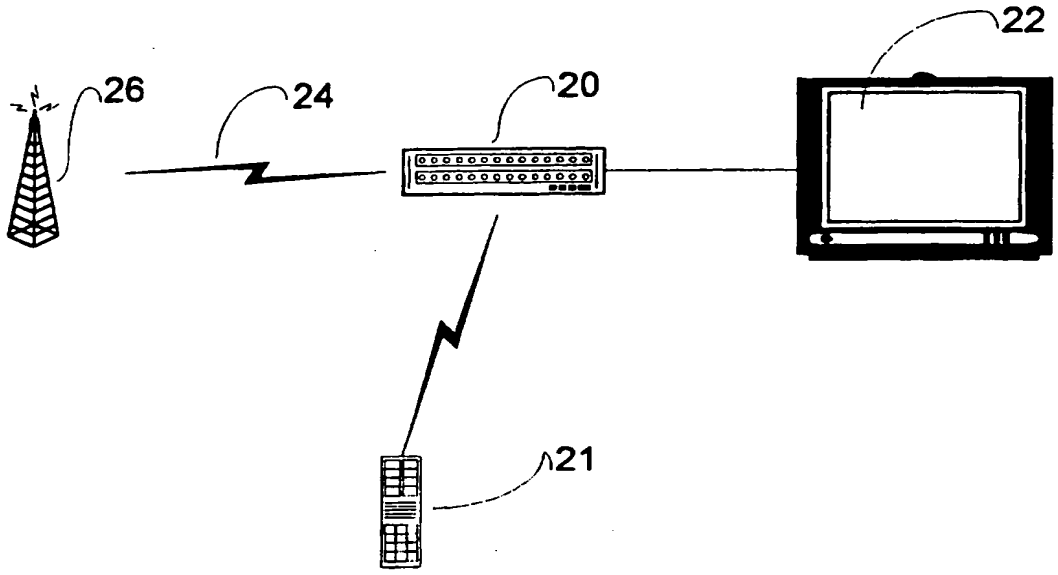

FIG 1

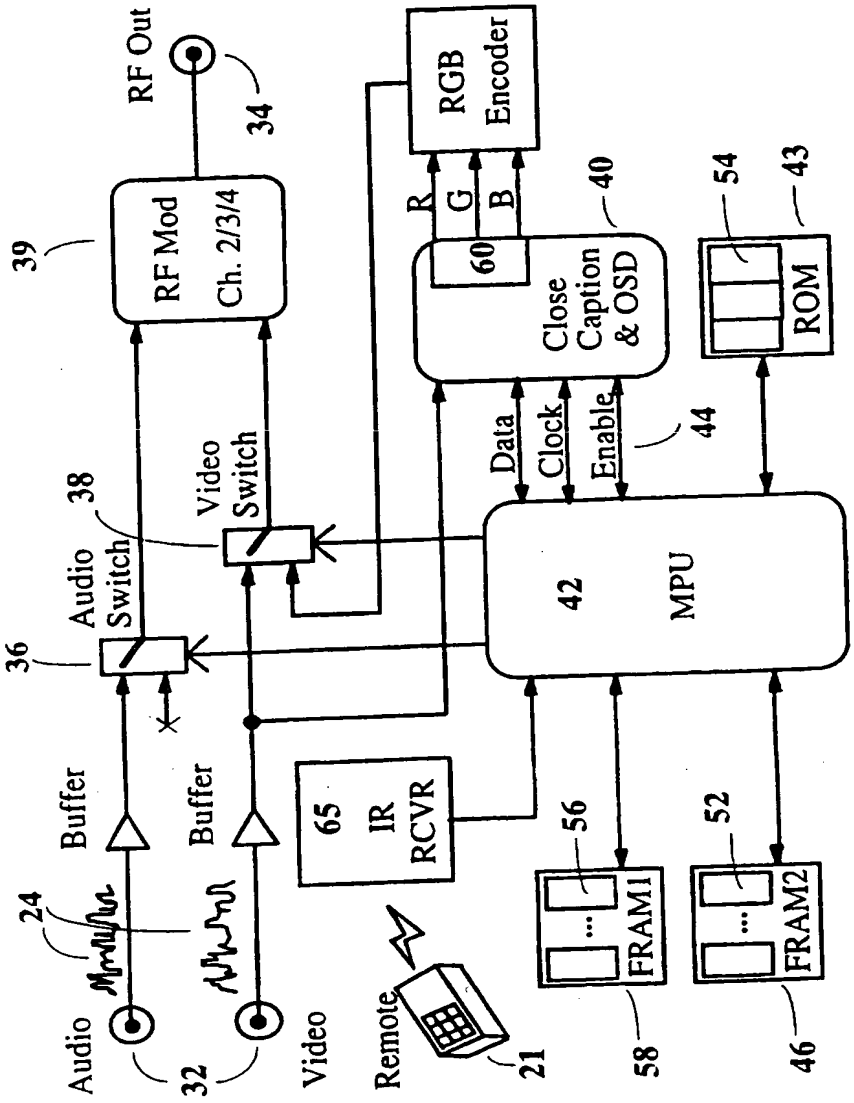
RF Out
34
RGB Encoder
R
G
B
39
RF Mod Ch. 2/3/4
60
40
Close Caption & OSD
54
ROM
43
Video Switch
38
Audio Switch
Data
Clock
Enable
44
36
42
MPU
Buffer
Buffer
65
IR RCVR
56
52
24
FRAM1
FRAM2
Audio
Video
Remote
21
58
46
32

Figure 2

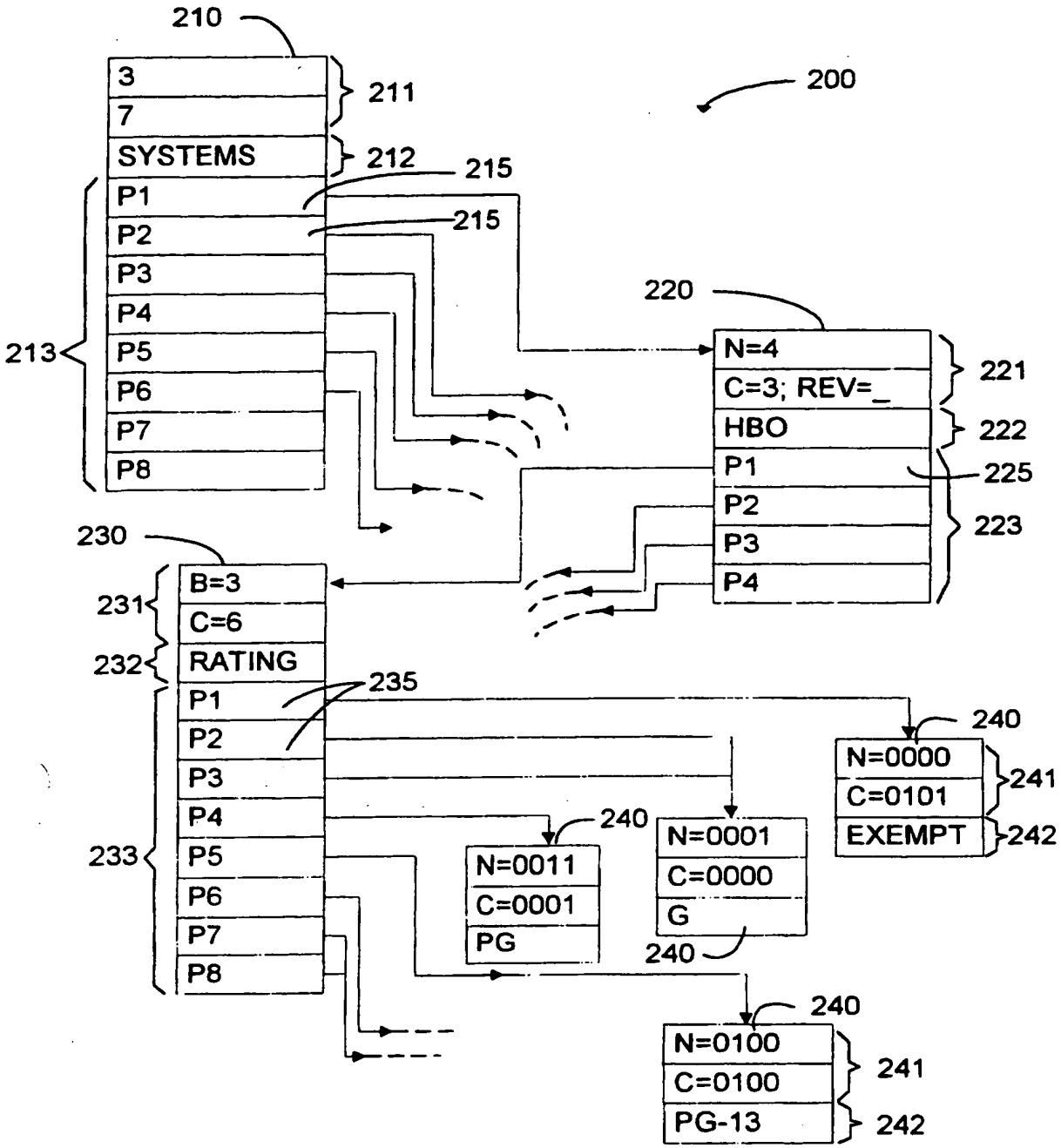

FIG. 3

FIGURE 4A

	bit6	bit5	bit4	bit3	bit2	bit1	bit0
char1	1	v2	v1	v0	c2	c1	c0
char2	1	s2	s1	s0	l2	l1	l0

FIGURE 4B

	bit6	bit5	bit4	bit 3	bit2	bit1	bit0
char1	1	0	0	1	0	1	0
char2	1	0	1	0	0	0	1

FIGURE 5

Program Information Receive

```
begin;
get(Start, Type);        ' Start is the character that identifies the XDS class
                         'Type is the character that identifies the meaning
                         'of the data within the class

* Current Class
if Start=01 then
        begin
        if Type=02 then get(string, duration + time_in_show);
        if Type=03 then get(string, title);       'get index which identifies label
        if Type=04 then get(index, type(T_type));    'retrieve category information
        if Type=05 then for N=1 to number_of_categories
        begin
        get(n_level(N), classification);          'n_level(N) is an array
        parse(configuration, classification);
        end;
        end;
* Channel Information Class
if Start=05 then
        if Type=02 then get(string, channel);          'retrieve call letters of station
* Miscellaneous Class
if Start=07 then
        if Type=01 then get(string, time_of_day);
        clock=convert(time_of_day);          'set internal clock
* Undefined Class
if Start=0D then
        begin
        if Type=05 then get(string, configuration);
end;
```

FIGURE 6

```
0Dh 05h 7Eh R A T I N G 0Fh + Checksum
0Dh 05h E X E M P T 0Fh + Checksum
0Dh 05h G E N E R A L 0Fh + Checksum
0Dh 05h P G 0Fh + Checksum
0Dh 05h A D U L T 0Fh + Checksum
0Dh 05h R E S T R I C T E D 0Fh + Checksum
0Dh 05h 7Eh V I O L E N C E 0Fh + Checksum
0Dh 05h N O N E 0Fh + Checksum
0Dh 05h C O M E D I C 0Fh + Checksum
0Dh 05h M I L D 0Fh + Checksum
0Dh 05h B R I E F 0Fh + Checksum
0Dh 05h S T R O N G 0Fh + Checksum
0Dh 05h G R A P H I C 0Fh + Checksum
0Dh 05h 7Eh L A N G U A G E 0Fh + Checksum
0Dh 05h N O N E 0Fh + Checksum
...
0Dh 05h E X P L I C I T 0Fh + Checksum
0Dh 05h 7Eh S E X U A L I T Y 0Fh + Checksum
0Dh 05h N O N E 0Fh + Checksum
...
0Dh 05h E X P L I C I T 0Fh + Checksum
0Dh 05h 7Fh L A B E L S 0Fh + Checksum
0Dh 05h A C T I O N 0Fh + Checksum
0Dh 05h S E X U A L I T Y 0Fh + Checksum
...
0Dh 05h N U D I T Y 0Fh + Checksum
```

INTERNATIONAL SEARCH REPORT

Inten .nal Application No
PCT/CA 97/00421

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04N7/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 678 091 A (MARTIN JUAN) 24 December 1992	19
Y	see page 7, line 1 - line 19	21-24
A	see page 3, line 20 - page 6, line 3	1,2,5, 10-13, 17,18,20

X	PATENT ABSTRACTS OF JAPAN vol. 009, no. 075 (E-306), 4 April 1985 & JP 59 210782 A (MATSUSHITA DENKI SANGYO KK), 29 November 1984,	19
Y		10,21-24
A	see abstract	1,2,17, 18,20, 22-25
	--- -/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 September 1997	29.09.97

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

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PCT/CA 97/00421

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 2 209 417 A (VOGEL PETER S) 10 May 1989 see page 3, line 23 - page 4, line 15	10,21
A	see page 4, line 35 - page 6, line 7; figure 1 see page 6, line 33 - page 7, line 36; figures 3,4 see page 8, line 13 - line 26	1,2,4, 11-13, 17-20, 22-25
A	& US 4 930 158 A (VOGEL ET AL.) cited in the application ---	
A	EP 0 413 225 A (GRUNDIG EMV) 20 February 1991 see column 4, line 5 - column 5, line 36; figure 1 see abstract -----	1,2,10, 17,19, 21-25

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Inter. nal Application No
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